

**AQUATIC
PESTICIDE
PERMITS**

**Aquatic Noxious
Weed Control
NPDES
General Permit
Monitoring
Information**

Annual Group Monitoring Plan

For

**Lake and River Aquatic Herbicide Applications
performed under the Noxious Weed National
Pollutant Elimination System Discharge (NPDES)
Permit (2003)**

**Prepared by Kathy Hamel
Washington Department of Ecology**

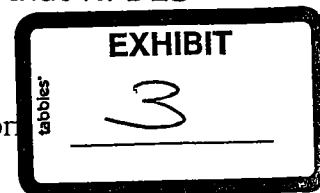
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Introduction

The purpose of the monitoring plan is to ensure that reliable data are collected and appropriately maintained under the Noxious Weed National Pollutant Discharge Elimination System (NPDES) permit for lakes and rivers. This is required compliance monitoring. This document incorporates a set of operating procedures and principles to be strictly followed to produce data of known and defensible quality.

Project Description

Based on a 9th Circuit court decision, the Washington Department of Ecology (Ecology) determined that NPDES



permits are required for the application of pesticides to Washington waters of the state. The Noxious Weed NPDES permit requires monitoring of aquatic herbicides applied to manage the growth of state-listed noxious weeds or quarantine list plants growing in aquatic situations. This permit states that the Permittee or its designee may choose to participate in a Group Monitoring Plan or follow the monitoring schedule as set out in the permit. Monitoring is required beginning in the 2003 treatment season and thereafter. Ecology issued a state-wide Noxious Weed NPDES permit to the Washington Department of Agriculture (Agriculture) and they, in turn, provide coverage to cooperators for noxious weed herbicide applications in state waters.

This Lake and River Aquatic Herbicide Monitoring Plan is a Group Monitoring Plan for herbicide applications to freshwater lake or river vegetation. The types of noxious weeds covered under the Lake and River Group Monitoring Plan include submersed species such as Eurasian watermilfoil (*Myriophyllum spicatum*) and Brazilian elodea (*Egeria densa*), floating leaved plants such as the fragrant water lily (*Nymphaea odorata*), and floating mat, rooted species such as parrotfeather (*Myriophyllum aquaticum*).

Agriculture has prepared a Group Monitoring Plan for spartina herbicide applications (noxious marine emergent plants) and a separate Group Monitoring Plan for noxious freshwater emergent plant herbicide applications. The monitoring after the treatment of emergent noxious weeds, often seen along lake shorelines and in wetland areas, such as purple loosestrife (*Lythrum salicaria*) or garden loosestrife (*Lysimachia vulgaris*) will be covered under the Freshwater Emergent Group Monitoring plan.

The data collected under each of these monitoring plans will be compiled at the end of the permit cycle into a single monitoring report. Any monitoring for the Noxious Weed NPDES permit compliance should follow the field procedures, the laboratory procedures, and the reporting procedures set out in these Group Monitoring Plans.

The Lake and River Aquatic Herbicide Monitoring Plan is intended to provide guidance to those cooperators who treat noxious weeds growing in Washington lakes and

rivers. To minimize monitoring costs for those cooperators who are treating noxious weeds using private funds, Ecology is requiring Aquatic Weed Management Fund grant recipients to monitor herbicide residues if they use herbicides. Each year this monitoring plan will be updated as new grant projects are funded. The monitoring results from each year will be posted on the Ecology website.

Monitoring Plan Goal

The goal of this monitoring plan is to provide guidance, information, and explain the sampling and laboratory protocols and procedures to the NPDES permit cooperators to allow the collection of quality data. The plan will be updated annually and adjusted to ensure sufficient data will be collected to answer the questions posed in the Noxious Weed NPDES permit. When this data is compiled at the end of the four-year monitoring period, we will be able to determine:

- Water herbicide concentrations after treatment using alternative methods of application,
- Water herbicide concentrations after treatment in different locations in Washington,
- Water herbicide concentrations after treating different species of noxious weeds,
- The concentration and transport of herbicides after application,
- The relative herbicide persistence in the water column, and
- Plant species surveys (efficacy of treatment and species diversity after treatment).

Data from United States Environmental Protection Agency (EPA)-approved persistence studies for 2,4-D, diquat, fluridone, endothall, glyphosate, imazapyr, and triclopyr will also be included with the final monitoring report for this permit.

Parameters

The following herbicide active ingredients are allowed for use in Washington lakes and rivers under the Noxious Weed NPDES permit for the 2003 treatment season:

- 2,4-D: 2,4-Dichlorophenoxyacetic acid, dimethylamine salt
- 2,4-D: 2,4-Dichlorophenoxyacetic acid, butoxyethyl ester
- Fluridone: 1-methyl-3-phenyl-5-[3-(trifluoromethyl)phenyl]-4(1H)-pyridinone
- Glyphosate: N-(phosphonomethyl)glycine, isopropylamine salt
- Endothall: Dipotassium salt of 7-oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid
- Diquat: Dibromide 1,1'-ethylene-2,2'-bipyridylium dibromide salt

The following two herbicides may be allowed for use in Washington after EPA aquatic registration and updated Ecology Environmental Impact Statements.

- Triclopyr (registered by EPA for aquatic use in November, 2002)
- Imazapyr (undergoing the EPA registration process for aquatic use)

Recommended Analysis Methods for Herbicide Residue Water Samples

EPA publishes laboratory analytical methods that are used by industries and municipalities to analyze the chemical and biological components of wastewater, drinking water, sediment, and other environmental samples that are required by EPA regulations under the authority of the Clean Water Act and the Safe Drinking Water Act. Almost all of these methods are published by EPA as regulations at Title 40 of the Code of Federal Regulations. The methods shown in the table below were recommended by industry for the analysis of these

aquatic herbicides in water. The enzyme linked immunosorbent assays (ELIZA) are allowed for use in the noxious weed NPDES permit as long as they have received Ecology accreditation.

2,4-D	Fluridone	Glyphosate	Endothall	Diquat
CAS 94-75-7	CAS 59756-60-4	CAS 31071-83-6	CAS 145-73-3	CAS 6385-62-2
ELIZA for AquaKleen®*	FasTEST® (ELIZA for Sonar®)*	EPA - 547	ELIZA for Aquathol® products*	EPA - 549.1
EPA - 8151			EPA - 548.1	

* Ecology accreditation pending

Analysis Costs

Analysis costs can be dependent on the number of samples, the method, and the laboratory. Cerexagri performs ELIZA tests for AquaKleen® (2,4-D) and endothall for free if their products are used, however their ELIZA test had not been accredited for 2003 monitoring.

Approximate Sample Volumes, Preservation, and Holding Times for Each Method (Follow the Laboratory Protocols)

Parameter	Sample volume required	Container	Preservative	Laboratory Holding Time
2,4-D EPA 8151	1 liter	Brown Glass	Cool 4°C dark	48 hours
2,4-D AquaKleen®*	Check with Cerexagri (may not be accredited)			
Fluridone* FasTEST	Check with Sepro (may not be accredited)			
Endothall EPA 548.1	250 ml	Amber Glass	Cool, 4° C, dark, HCl	7 days until extraction
Endothall* Aquathol®	Check with Cerexagri (may not be accredited)			
Diquat EPA 549.1	1 liter	Amber PVC - high density	Cool, 4° C, add acid, dark	7 days until extraction
Glyphosate EPA 547	40 ml	124 ml Amber Glass	Cool, 4° C, dark	14 days

*The ELIZA tests are proprietary. The companies will only do the analyses when their products are used for the treatment.

Preservation

Methods for preservation are relatively limited and are intended to retard biological action, retard hydrolysis and photolysis of chemical compounds, and reduce the volatility of constituents. Follow the preservation methods recommended by the laboratory for the analysis. Most of the herbicides are light sensitive and should immediately be stored in the dark. Keep the samples cold and in the dark by keeping them on ice in an ice chest until they are delivered to the laboratory. To help minimize cross contamination between samples, individually place each sample bottle in an appropriately-sized zip lock bag before storing it in the ice chest. Follow the laboratory shipping procedures. Some laboratories do not want samples shipped with loose ice and require that ice packs be used.

Laboratory Procedures

All monitoring data collected under NPDES permits shall be prepared by a laboratory registered or accredited under the provisions of, Accreditation of Environmental Laboratories, Chapter 173-50 WAC. The laboratory must be accredited for the parameter being analyzed. Analyses conducted using enzyme linked immunosorbent assay (ELISA) methods are acceptable as long as the analysis is performed by a laboratory accredited by Ecology for that parameter.

Please check the accreditation status of the laboratory for the herbicide you are having analyzed before contracting with the laboratory. These laboratories may not maintain their accreditation from year to year.

For the most recent update of accredited laboratories – see this website
<http://www.ecy.wa.gov/programs/eap/labs/srchmain.htm>

Sampling Procedures

Sample Containers

Water collected for laboratory analyses will be placed in the appropriate size and style of bottles which will be provided in advance by the contract laboratory. Check to make sure that the bottles contain the proper preservatives, if needed. The sample bottles must be labeled prior to being filled to indicate the sample date and time, location, water depth that sample is taken at (most should be surface samples), and analyses to be performed. Blank bottle labels will normally be provided by the laboratory. If samples are collected in the laboratory bottles, make sure that any preservatives are not lost when filling the bottle.

Field Data Sheet

All information pertinent to the laboratory sample collection will be written down on a monitoring data sheet. The information will include: date, time of sample collection, name of person collecting the sample, sample locations within the waterbody.

General sampling provisions:

- Ideally the person sampling should not be the applicator or use applicator's boat or equipment because of the possibility of sample contamination;
- Collect samples from the untreated area first before taking the samples in the treated area;
- When collecting samples from a boat, take the samples near the bow, away and upwind from any gasoline outboard engine. Orient the boat so that bow is positioned in the upstream direction;
- When wading, collect samples upstream from where you are standing;
- Avoid disturbing the sediments in the immediate area of sample collection;
- Collect samples from the depth of about an arm's length in a lake. These are considered to be surface

samples.

Sample Collection

- Keep the sampling bottles unopened until the moment they are to be filled.
- Carefully remove the cap, taking care to not contaminate the inner surface. Do not handle the inside of the cap or the neck or inside of the bottle.
- Take samples by holding bottle by its base and plunging it below the surface. Then turn the bottle slowly upward directing the mouth of the bottle towards the current (if no current, move the bottle slowly away from your body or boat. Do not rinse the bottle.
- Leave an air space (approximately 1 inch) above the water level in the bottle to allow proper mixing of the water sample.
- Replace the cap immediately and tighten the cap securely.
- Place the sample bottle inside a zip lock bag.
- Immediately place the sample in an ice chest on ice packs or loose ice.
- Ship or transport the samples to the laboratory as soon as possible.
- Pack securely to prevent breakage in transit.
- Document everything you do. A permanent record lets others who may want to use your results know how the data were obtained so they can use the same procedures or at least know how to compare them.
- Be consistent. Don't change sampling method, equipment use, or station locations between sampling stations or sampling days without noting why the change was made and permanently identifying which data belongs to which set of

sampling techniques or equipment used.

Sampling with an Intermediate Vessel or Container

If the sample cannot be collected directly into the sample container to be submitted to the laboratory or if the laboratory provides prepreserved sample containers, use an unpreserved sample container or an intermediate vessel (e.g., beakers, buckets, dippers, or professional sampling devices) to obtain the water.

Specific Sampling Procedures for Selected Herbicides

2,4-D sampling procedures for submersed species: When spot treating a lake with a 2,4-D product for submersed species, such as Eurasian watermilfoil, surface water samples should be taken inside and outside of the largest continuous treated area within the waterbody. A pre-treatment sample should be taken to determine herbicide concentrations in the waterbody prior to herbicide application. Approximately 24 hours (one day) after herbicide application, a surface sample should be collected from the approximate middle of the treatment site, and another surface sample should be collected from a distance of 100 feet from the outside boundary of the treatment area. To minimize sample contamination, collect the sample from outside the treatment area first. Approximately 36 hours (three days) after the herbicide treatment another set of surface samples should be collected from the approximate same locations as the 24 hour samples. Follow the distances and timing intervals set out in your grant agreement. They may differ from this monitoring plan depending on the waterbody. The sample bottles should be clearly labeled and laboratory protocols for preservation, holding times, and shipping strictly followed. Use the sampling form to report results to Kathy Hamel (kham461@ecy.wa.gov).

2,4-D sampling procedures for parrotfeather: Immediately prior to treatment, a surface water sample will be collected adjacent to the edge of the parrotfeather infestation (within one foot of the plants). One hour after the entire parrotfeather infestation is sprayed, another surface water sample will be collected. This sample should be taken adjacent to the parrotfeather bed (within

one foot) and, if in flowing water, taken on the downstream side of the infestation. A final sample should be taken, in approximately the same place as the one hour sample, 24 hours after treatment. Follow the distances and timing intervals as set out in the grant agreement. The sample bottles should be clearly labeled and laboratory protocols for preservation, holding times, and shipping strictly followed. In 2003, samples should be taken from parrotfeather infestations that either had not been previously sprayed, or where the foliage has substantially grown back from the original treatment. Use the sampling form to report results to Kathy Hamel (kham461@ecy.wa.gov).

General 2,4-D sampling: When there are potable water intakes and/or irrigation intakes, samples may need to be taken to determine when 2,4-D levels have dropped below the drinking water standard or the irrigation restriction standard. These samples should be taken near the water intakes.

Glyphosate sampling procedures for the treatment of parrotfeather and water lilies: Immediately prior to treatment, a surface water sample will be collected adjacent to the edge of the plant infestation (within one foot of the plants). One hour after the entire infestation is sprayed; another surface water sample will be collected. This sample should be taken adjacent to the plant bed (within one foot) and, if in flowing water, taken on the downstream side of the infestation. A final sample should be taken, in approximately the same place as the one hour sample, 24 hours after treatment. Follow the distances and timing intervals as set out in your grant agreement. The sample bottles should be clearly labeled and laboratory protocols for preservation, holding times, and shipping strictly followed. In 2003, samples should be taken from infestations that either had not been previously sprayed, or where the foliage has substantially grown back from the original treatment. Use the sampling form to report results to Kathy Hamel (kham461@ecy.wa.gov).

Endothall sampling procedures for submersed species: When spot treating a lake with endothall for submersed species, such as hydrilla, surface water samples should be taken inside and outside of the largest continuous

treated area within the waterbody. A pre-treatment sample should be taken to determine herbicide concentrations in the waterbody prior to herbicide application. Approximately 24 hours (one day) after herbicide application, a surface sample should be collected from the approximate middle of the treatment site, and another surface sample should be collected from a distance of 100 feet from the outside boundary of the treatment area. To minimize sample contamination, collect the sample from outside the treatment area first. Approximately 48 hours (two days) after the herbicide treatment another set of surface samples should be collected from the approximate same locations as the 24 hour samples. Follow the distances and timing intervals as set out in your grant agreement. The sample bottles should be clearly labeled and laboratory protocols for preservation, holding times, and shipping strictly followed. Use the sampling form to report results to Kathy Hamel (kham461@ecy.wa.gov). * Note: we don't anticipate any endothall use for Ecology-funded noxious weed control this year.

Diquat sampling procedures for submersed species: A study is being done on diquat efficacy on Brazilian elodea. A separate Quality Assurance Project Plan for Battleground Lake has been prepared and will direct the monitoring for this herbicide in 2003.

Fluridone sampling procedures for submersed species: Fluridone requires a very long contact time at low concentrations to be effective in killing submersed species like Eurasian watermilfoil and Brazilian elodea. This is unlike the other herbicides allowed under the NPDES permit that require a short contact time to be effective. The objective with fluridone treatments is to maintain a low-level, but consistent concentration of herbicide in the water for ten or more weeks. Fluridone is used differently from the other herbicides and fluridone monitoring is conducted to monitor water concentrations rather than to determine herbicide residue persistence. King County will be reporting fluridone sampling from Pipe and Lucerne Lakes.

2003 Projects:

- Lake Washington, King County: Hunts Point (2,4-D

monitoring, water quality monitoring)

- Spring Lake, King County: (2,4-D monitoring, glyphosate monitoring)
- Diamond Lake, Pend Oreille County: (2,4-D monitoring)
- Lake Sacheen, Pend Oreille County: (2,4-D monitoring, water quality monitoring)
- Pipe and Lucerne Lakes, King County: (fluridone monitoring)
- Battleground Lake, Clark County: (diquat water and sediment monitoring, plant biomass and frequency of occurrence, water quality monitoring)
- Loomis Lake, Pacific County: (plant biomass and frequency of occurrence after 2002 fluridone treatment)
- Kress Lake, Cowlitz County: (plant biomass and frequency of occurrence 3 years after endothall treatment)
- Newman Lake, Spokane County: (2,4-D monitoring)
- Parrotfeather, Yakima County: (glyphosate monitoring, 2,4-D monitoring)
- Welcome Slough, Wahkiakum County: (dissolved oxygen monitoring after diquat application)

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